

Article

Preliminary Discussion on the Highly Radiogenic Lead in Unalloyed Copper Artifacts of the Eastern Zhou Dynasty: Starting from the Huili Copper Spearheads

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Received: 22 August 2020; Accepted: 15 September 2020; Published: 17 September 2020

Table S1. The results of four runs for the SRM981 determination and published values.

Number	²⁰⁶ Pb/ ²⁰⁴ Pb	²⁰⁷ Pb/ ²⁰⁴ Pb	²⁰⁸ Pb/ ²⁰⁴ Pb
1	16.941	15.496	36.718
2	16.943	15.498	36.719
3	16.943	15.498	36.717
4	16.943	15.496	36.719
Standard value ¹	16.942	15.496	36.72

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Table S2. The lead isotope data of unalloyed copper artifacts of the Shang and Eastern Zhou dynasties, and copper ore samples of modern copper deposits in Huili.

Lab No.	Artifacts	Sites	Province	Dates	Cu	Sn	Pb	²⁰⁷ Pb/ ²⁰⁶ Pb	²⁰⁸ Pb/ ²⁰⁶ Pb	²⁰⁶ Pb/ ²⁰⁴ Pb	²⁰⁷ Pb/ ²⁰⁴ Pb	²⁰⁸ Pb/ ²⁰⁴ Pb	Data source
30	Sickle	Himenkou	Yunnan	the Spring and Autumn Period the Late Shang	97.39	0.51	0	0.7707	2.0055	20.493	15.791	41.098*	1
ZY-892	Battle axe	Chengdu Jinsha	Sichuan	Dynasty to Early Zhou the Late Shang	√	0.43	0.45	0.7417	1.9575	21.602	16.022	42.286	2
ZY-878	Dagger-axe	Chengdu Jinsha	Sichuan	Dynasty to Early Zhou the Late Shang	√	0.83	0.63	0.6995	1.8834	23.411	16.375	44.091	2
SD003	Axe	Suide	Shaanxi	Shang Dynasty the Late	100	0	0	0.779	1.988	20.366	15.858	40.49	3
ZZ008	Axe	Zizhou	Shaanxi	Shang Dynasty the Late	99	0.4	0.6	0.783	2.003	20.251	15.862	40.553	3
HZ112	ding tripod	Hanzhong	Shaanxi	the Shang Dynasty	√	—	—	NG	NG	20.095	15.864	40.567	4
HZ326	ge Blade	Hanzhong	Shaanxi	the Shang Dynasty	√	—	—	NG	NG	20.184	15.844	40.816	4
HZ256	Sickle-Shaped objects	Hanzhong	Shaanxi	the Shang Dynasty	√	—	0.53	NG	NG	23.042	16.205	43.75	4
HZ260	Sickle-Shaped objects	Hanzhong	Shaanxi	the Shang Dynasty	√	—	0.41	NG	NG	20.526	15.851	41.13	4

HZ265	Sickle-Shaped objects	Hanzhong	Shaanxi	the Shang Dynasty	√	—	0.06	NG	NG	22.359	16.125	43.194	4
HZ266	Sickle-Shaped objects	Hanzhong	Shaanxi	the Shang Dynasty	√	—	—	NG	NG	19.966	15.813	40.367	4
HZ271	Sickle-Shaped objects	Hanzhong	Shaanxi	the Shang Dynasty	√	—	—	NG	NG	19.502	15.814	39.985	4
HZ282	Sickle-Shaped objects	Hanzhong	Shaanxi	the Shang Dynasty	√	—	—	NG	NG	19.643	15.856	40.262	4
HZ292	Zhang scepter	Hanzhong	Shaanxi	the Shang Dynasty	√	—	—	NG	NG	20.304	15.866	40.838	4
HZ294	Zhang scepter	Hanzhong	Shaanxi	the Shang Dynasty	√	—	0.33	NG	NG	19.962	15.819	40.637	4
YX017	Bow-Shaped objects	Yin Ruins	Henan	the Late Shang Dynasty	√	—	—	0.7697	1.9844	19.942	15.3487	39.5723	2
YX019	Dagger-axe	Yin Ruins	Henan	the Late Shang Dynasty	√	—	—	0.7669	1.9737	20.5551	15.7641	40.5691	2
YX020	Dagger-axe	Yin Ruins	Henan	the Late Shang Dynasty	√	—	—	0.7808	1.9968	19.8362	15.4881	39.6087	2
YX035	ce	Yin Ruins	Henan	the Late Shang Dynasty	√	—	—	0.7271	1.9238	21.7645	15.8255	41.8712	2
45636	jia	Luoshan Tianhu	Henan	the Late Shang Dynasty	99.2	—	—	0.7332	1.9202	21.804	15.985	41.867	5
94173	ding	Wuchen	Jiangxi	the Shang	97.1	0.7	—	0.7796	2.0034	20.855	16.259*	41.780*	6

ZY-17 51	Container scraps	g Yueyan g Zhangshutan	Hunan	Dynasty the Late Shang Dynasty	4	99.5	—	—	0.7732	1.9831	20.495	15.846	40.643	7
M-95	chalcoppyrite	Huili Xiaoqinshan	Sichuan	-	-	-	-	NG	NG	21.85	15.86	40.22	8	
11ZK2-17	chalcoppyrite	Huili Lala copper deposit	Sichuan	-	-	-	-	NG	NG	20.595	16.167	38.689	9	
9ZK5-17	chalcoppyrite	Huili Lala copper deposit	Sichuan	-	-	-	-	NG	NG	18.103	15.883	38.380	9	
29	chalcoppyrite	Huili Dahongshan copper deposit	Yunnan	-	-	-	-	NG	NG	19.396	15.764	38.754	9	
930-23	chalcoppyrite	Huili Dahongshan copper deposit	Yunnan	-	-	-	-	NG	NG	18.324	15.587	38.240	9	
30	chalcoppyrite	Huili Dahongshan copper deposit	Yunnan	-	-	-	-	NG	NG	19.547	15.688	40.485	9	

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- √—indicates that the objects are unalloyed copper artifacts, but no specific value of Cu is given in the original paper.
- —means below detection limit (~ 200 ppm for lead).
- NG—means not given.
- *—means it is calculated based on the original data ($^{207}\text{Pb}/^{206}\text{Pb}$, $^{208}\text{Pb}/^{206}\text{Pb}$, and $^{206}\text{Pb}/^{204}\text{Pb}$) for drawing convenience.

